United States Department of Agriculture | Forest Service | NA | MFO

Reply to: 3420 January 9, 1991

Subject: Ozone damage on white pine, Marlinton and White Sulphur Ranger Districts

To: Jim Page, Forest Supervisor, Monongahela National Forest

We have previously reported (8/20/90) that ozone symptoms were seen on white pines on the Marlinton and White Sulphur Ranger Districts. Bill Jackson of my staff examined the white pines on 9/11 and 9/12/90 to determine if any biotic factors rather than ozone could have caused the foliar injury on the pines; especially if any needle cast fungi were present or if procera root disease (Verticicladiella procera) was present.

Bill saw procera root disease evident occasionally in plantations. The trees effected by procera root disease were less than 20 years old and the trees had a black, resin soaked stain on the root collar. In contrast, the majority of the pines showing ozone symptoms were greater than 20 years old and had no black stain at the root.

Bill observed white pine seedlings dying which were growing in the ditch along State Roads 92 and 28; these white pine were probably dying as a result of exposure to salt. We suspect that road salt is used during the winter and consequently, we could expect to see some white pines dying along the roadside because of the exposure to salt.

Foliage samples were collected from trees showing ozone symptoms to determine if a foliage disease was present. Alan Iskra of our FPM staff conducted extensive laboratory isolations and recovered no foliar pathogens. Only a saprophytic fungus (Sphaerographium sp.) was recovered from the foliage. The fruiting bodies of this saprophytic fungus were easily found on the dead portion of the needles.

Foliage samples were also examined by Dr. John Skelly (Pennsylvania State University), Dr. Keith Jensen (NEFES, Delaware, Ohio) and Dr. Leon Dochinger (NEFES, Delaware, Ohio) and all concur that the symptoms on the white pines are probably a result of exposure to ozone.

A road survey was conducted and we observed a small percentage (about 1-2%) of the white pine had symptoms of ozone damage on approximately 300,000 acres within the Forest boundary (Figure 1). Some of the white pines will die, but we expect many of the trees to produce a new flush of foliage in 1991.

cc Districts 1-22-91

We suspect that ozone causes some stress to the susceptible white pines each year, and conditions were just right in 1990 that needle tip burning occurred. The stress from ozone could cause growth reductions and possibly increase the likelihood of death if another stress factor such as drought is present. There were several years of drought present in this area in the late 1980's and some evidence of drought stress and exposure to ozone was present on the pines around Lake Sherwood. Many of the white pines had chlorotic (yellowing) crowns, some tip burning of the needles, and a sparse development of foliage in the crown. The sparse development of foliage was a result of only one or two lateral branches forming at a node. Typically, we expect to find at least three branches in a whorl.

Please contact us if you have any questions or require additional assistance.

PETER A. RUSH
Field Representative
Forest Pest Management

Enclosure

cc: AO
MNF, Marlinton RD
MNF, White Sulphur RD
MNF, B. Edgerton

WAJ/PAR/mae

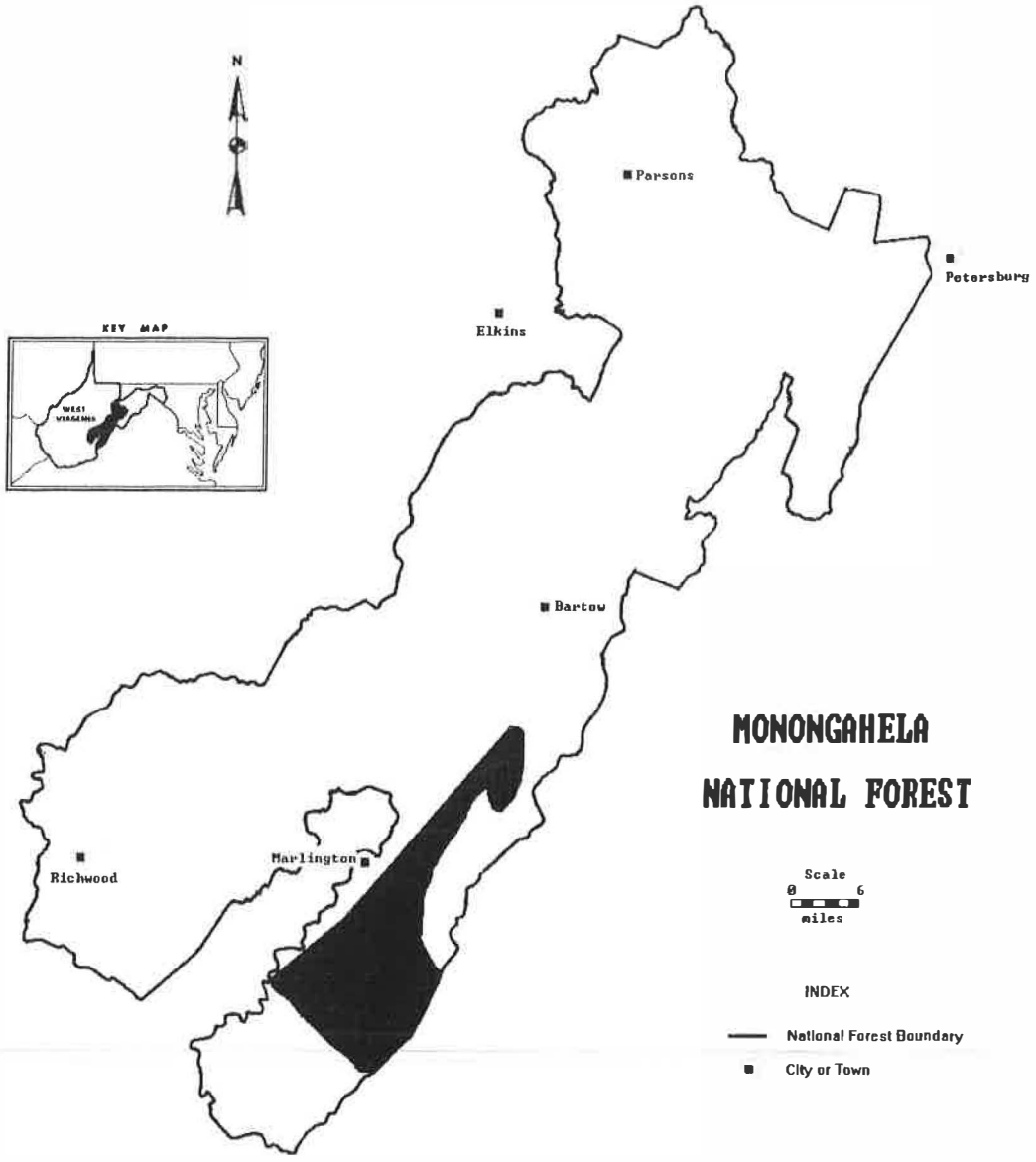

Figure 1. Approximate location of white pines showing ozone symptoms.